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ENERGY STAR BUILDINGS℠ MANUAL

The Action Plan For ENERGY STAR Buildings℠ Success

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Action Plan

The Action Plan For Energy Star Buildings℠ Success Overview

As with any other business venture, the key to capturing profits from energy efficiency is planning and successful execution. Energy Star Buildings has a comprehensive strategy that will allow you to plan, carry out, and communicate your whole-building upgrades.

The Action Plan described here can serve as the framework for planning a whole-building upgrade. When used as a planning tool, and integrated and adopted as your organizational strategy, the Action Plan can help ensure that you can profitably achieve energy savings of 30 percent or more. By developing a comprehensive view of the upgrade process at the outset, it will be possible to manage all components to ensure a successful outcome for your organization—optimizing energy use and realizing significant savings. The Action Plan, developed from the experiences of successful Energy Star Buildings Partners, is based on the following framework:

I. Plan And Benchmark

- **Adopt an energy strategy,** if one is not already in place.
- Plan your strategy with key staff.
- **Develop baselines** to use as benchmarks for future energy savings.
- **Forecast savings** to determine your potential.
- **Secure funding** based on your organization's financial profile.

II. Use An Integrated Approach

- **Implement upgrades** by following the Energy Star Buildings Five Stage Approach and procuring professional assistance as required.

III. Communicate Success

- **Celebrate** and publicize your successful upgrades within your organization and throughout the community.

The Energy Star Buildings Action Plan worksheet (Figure 1) lists the major steps (milestones) and related tasks in a handy checklist format.

Figure 1: Energy Star Buildings℠ Action Plan

Organization: _____

Prepared by: _____

Date: _____

Milestone	*Responsibility*	*Target Completion Date*	✔
Adopt A Strategy			
Review your organization's energy strategy			
Review your MOU			
Confirm or secure top management commitment			
Designate a strategic energy director			
Select an energy program team			
Hold an Energy Star Buildings kickoff meeting			
Develop Baselines			
Profile your total facility			
Select a pilot building			
Profile your pilot building energy use			
Identify where energy is used in your pilot building			
Forecast Savings			
Stage One – Plan lighting upgrades			
Stage Two – Plan building tune-up			
Stage Three – Plan other load reductions			
Stage Four – Plan fan system upgrades			
Stage Five – Plan heating and cooling system upgrades			
Secure Funding			
Determine your organization's financial profile			
Interview financial personnel			
Analyze all possible funding approaches			
Select appropriate funding method			
Account for, track, and report on savings and cash flows			
Implement Upgrades			
Develop detailed upgrade proposal			
Present final proposal to upper management			
Select contractors for design and construction			
Manage installation of upgrades			
Monitor results			
Celebrate Success			
Announce your success within your organization			
Publicize your upgrade's environmental benefits to the community			
Share upgrade information with EPA			
Apply to become Energy Star Buildings Partner of the Year			

Plan And Benchmark

Adopt A Strategy

A business strategy provides guidelines for day-to-day decisionmaking based on the long-term goals of the organization. A good energy strategy recognizes that energy costs are not an unmanageable expense, but can be reduced by investing in energy-efficiency upgrades. In this vein, an energy strategy can help you make purchasing decisions based on long-term return, rather than quick paybacks. And, if there is equipment that needs to be repaired or replaced, an energy strategy can help determine the right type of equipment to meet the building's current or projected needs. A good energy strategy functions like a good business plan—regardless of your organization's goals, an energy strategy will improve your organization's long-term bottom line.

Energy optimization is not simply energy conservation, which reduces energy use without addressing productivity. Neither is it simply energy efficiency, which reduces energy consumption while maintaining current production levels. Energy optimization is a business opportunity that focuses on decreasing energy costs while increasing workers' productivity, improving sales, and boosting property values. Energy optimization combines energy-efficient equipment with operational procedures that can actually transform energy bills into a "profit center," because energy cost savings go directly to the bottom line. This is one of the top benefits of using the ENERGY STAR Buildings strategy.

What does it mean to turn energy bills into a profit center? Once part or all of your whole-building upgrades are complete, the improvements in energy efficiency will result in savings on your energy bill. These savings constitute an internal profit center. Initially, these savings may be applied toward payments for the upgrades. Upgrades may even pay for themselves through money saved from reduced energy bills. And long after the upgrades have been completed, they will continue to produce "revenue" through ongoing savings.

It is possible to establish immediate recognition and appreciation for your energy strategy by documenting results and publicizing them inside your organization. This will help provide a clear picture to top management of how upgrades have generated profits, which can pave the way for the approval of additional upgrades in the future.

Review Your Organization's Energy Strategy

What is your organization's energy strategy? If there is no written policy on energy management, you can gauge the current priorities by talking with the energy, engineering, and facilities staff about their approach to energy management, energy efficiency, equipment replacement, and long-term planning.

To create an environment for energy optimization, a good energy strategy should include the following:

- Top management commitment to energy efficiency and ongoing involvement with the energy strategy and its implementation.

- A qualified energy director with financial accountability.
- A clear definition of how the organization will improve its profitability or effectiveness through energy optimization.
- A plan that ensures steady progress toward energy optimization, including guidelines for handling day-to-day issues relating to energy equipment and operations.
- A method to monitor and track cost savings from energy-efficiency upgrades and to determine their impact on the organization's bottom line.

If a well-developed energy strategy is not in place at your organization, the ENERGY STAR Buildings Memorandum Of Understanding (MOU) is designed to serve as the basis for your strategy. Create an energy strategy by adding to the MOU until it is tailored to the specific needs and goals of your organization.

Review Your MOU

As an ENERGY STAR Buildings participant, your organization signed an MOU agreeing to improve the energy efficiency of your facilities by implementing profitable upgrades. This voluntary agreement, based on the experience of successful organizations profitably achieving energy savings of 30 percent or more, outlines the basic premises of the ENERGY STAR Buildings Partnership.

MOU In Brief

Common Agreements And Principles

This is a voluntary agreement between Partner and the United States Environmental Protection Agency (EPA), by which the two parties enter EPA's ENERGY STAR Buildings and Green Lights® (Partnership) designed to prevent pollution through the use of a strategic energy-efficient approach. Each party agrees to assume the good faith of the other party as a general principle for the Partnership.

Either party can terminate this agreement, without penalty or liabilities to either, via 10 days' written notice to the other, and both will then cease to publicize Partner's participation in the Partnership. This Memorandum of Understanding may be terminated only by the original authorized signatory or a representative of equal or greater authority.

MOU In Brief (continued)

Partner Agrees To:

Plan And Benchmark

- Designate a Strategic Energy Director and a Communications Director upon signing this agreement.
- Conduct a kickoff meeting with assistance from EPA.
- Upgrade at least one Pilot Building within two years of the effective date of this agreement.

Use An Integrated Approach

- Upgrade 60 percent of Partner's eligible facilities within seven years, according to the Partnership's Five Stage Integrated Approach to maximize energy savings to the extent that the upgrades are profitable and maintain or improve productivity and worker comfort.

Communicate And Demonstrate Success

- Submit annual ENERGY STAR Buildings Utility Data Report or the equivalent electronic progress report to EPA for completed survey or upgrade projects.

EPA Agrees To:

Assist Partner In Planning And Benchmarking

- Designate a customer service representative (Account Manager) to assist Partner.
- Conduct a kickoff meeting with Partner.
- Provide tools to assist with benchmarking and scheduling.

Help Partner Use Integrated Approach

- Offer workshops and objective information about energy-efficient technologies and applications.
- Provide analytical tools that help Partner calculate potential savings from upgraded systems.
- Administer an ENERGY STAR Buildings Ally Program.

Communicate Partner's Success

- Develop case studies documenting monitored savings for specific facilities and technologies.
- Provide recognition for Partners that show exemplary reductions in energy use including one major media event each year and public service announcements.
- Provide reproducible materials for Partner, upon request, to publicize Partner's accomplishments.
- Provide educational materials to communicate results of the Partnership within Partner's organization and to the public at large.

To maintain consistency and fairness among participants, this MOU may not be changed.

Confirm Or Secure Top Management Commitment

Organizations that complete successful whole-building upgrades cite top management commitment as a critical factor in their success. Executive and financial officers should be involved in the early stages of developing the energy strategy, such as the signing of the MOU, so that they understand the rationale for the low-risk, high-return investment opportunities presented by energy-efficiency upgrades.

Designate A Strategic Energy Director

The ENERGY STAR Buildings strategic energy director should be a person who has the authority to make energy efficiency a profit center in your organization. As the internal "champion," this individual must have the credibility to gain the confidence and trust of top executives. Ideally, someone on the current executive team will be enthusiastic about assuming this role. The energy director must be able to:

- Manage an energy program team that includes personnel from engineering, facilities, public relations, environmental affairs, and senior management and that involves contractors, utility personnel, and EPA representatives when appropriate.
- Take responsibility for the financial success of the organization's building upgrades and have the authority to allocate resources as needed.
- Maintain a close working relationship with the director of the physical plant.
- Identify opportunities to install energy-efficiency technologies by applying sound business analysis techniques.
- Educate in-house staff and your organization's stakeholders about the value of proven, energy-efficient technologies and the benefits of ENERGY STAR Buildings upgrades.
- Communicate successes to employees, senior management, the community, and EPA.

Selecting the right energy director results in successful whole-building upgrades. The energy director does not necessarily have to be an expert in either energy systems or financial management; however, he or she must have an understanding of and be able to communicate in both the energy and financial domains.

Select An Energy Program Team

The success of any energy strategy will depend not only on the energy director, but also on the cooperative efforts of the multidisciplinary energy program team. Your energy program team will include managers and staff with the skills necessary to turn upgrade plans into realities. To select the appropriate team, it is necessary to:

- Determine the skills that are needed for your planned upgrades.
- Evaluate the suitability of available personnel to meet these needs.
- Select team members from qualified and available staff.

- Procure other needed expertise and resources from vendors and contractors.

For a whole-building upgrade, it will likely be necessary to rely on outside professionals for some or all of your project. When doing so, it is important to benchmark your energy usage, so that you can approach the hiring of energy services in an informed manner (see Develop Baselines). Options for obtaining assistance include the following:

- Ask your local utility or an energy services company (ESCO) if it offers free or inexpensive energy audits.
- Invite lighting contractors and heating, ventilating, and air-conditioning (HVAC) contractors to inspect your facility and suggest upgrades. Let them know you are using the ENERGY STAR Buildings Five Stage Approach.
- Leverage your time by drawing on the expertise of ENERGY STAR Buildings Allies. Call the ENERGY STAR hotline at 1-888-STAR YES to get a list of Allies in your area. You may want to try the *Ally Services And Products (ASAP) Directory*, available on-line through the ENERGY STAR Web site at www.epa.gov/asap.
- Contract with an energy professional to coordinate and manage your project.
- Select turnkey services from an energy services company.

Once an energy program team is established, you are ready to proceed to the next task: holding the kickoff meeting.

Hold An ENERGY STAR Buildings Kickoff Meeting

The ENERGY STAR Buildings kickoff meeting should be held within six months of signing the MOU. The purpose of the kickoff meeting is to delegate responsibilities, profile your organization's energy use through benchmarking, and provide information and support as you build a new profit center. The energy director and program team will meet with your EPA account manager to discuss planning and implementing upgrades. The chief executive officer (or equivalent) and chief financial officer should attend the meeting to confirm their commitment to energy efficiency and the bottom line and to ask any questions they may have about funding profitable energy upgrades.

The kickoff meeting is an important milestone in getting your organization committed to a set of actions that allow significant reductions in energy costs and improve the bottom line.

Develop Baselines

Establishing your energy-use baseline identifies the best opportunities for upgrades in facilities and lays the foundation for measuring the energy and cost savings from upgrade projects. Regardless of whether upgrades are implemented by in-house staff or outside contractors, a baseline is a critical management tool. The baseline is a record of what energy is being used (electricity, natural gas, or other sources), what you are currently paying for energy, and how that energy is being used. A good baseline will allow you to:

- **Identify savings opportunities in facilities** by revealing where major costs are being incurred.
- **Pinpoint problem areas** by allowing you to see trends in energy use and compare data from your facilities with national averages for similar facilities.
- **Track your energy and cost savings** by providing a benchmark prior to the implementation of your upgrades.
- **Negotiate the best utility rate schedule** by giving you an evaluation of your energy use, which can be used later when discussing options with energy suppliers.
- **Secure funding** by providing clear documentation of the project's potential savings.
- **Negotiate with contractors** and/or energy service providers by providing information on which equipment should be upgraded or replaced and what the potential savings are.
- **Track progress and get recognition** for results, both within your organization and from EPA, by providing a record of your facility's energy costs before and after the upgrades are installed.

To develop a useful baseline, gather and analyze information on the quantities of energy used from different sources over a period of time (for example, electricity, natural gas, and fuel oil); the relative costs of energy from each source; and the quantity and cost of energy consumed for various purposes in your facilities.

After you have gathered baseline data for all of the buildings in your organization, an overall management plan and schedule can be determined.

Profile Your Total Facility

Begin by taking a look at all of your organization's facilities. Determine which type of buildings you have (such as office buildings or warehouses); the climate zone in which they are located; the square footage in each building; the square footage of conditioned space in each building; and if any major changes in operations are anticipated (for example, the addition of a night shift) that will affect the lighting and HVAC systems.

QuikPlan, a free software tool provided by EPA to all ENERGY STAR Buildings participants, will help you compile basic data about the characteristics and energy use of your facilities. The resultant information can be used to help select and profile a pilot building to demonstrate an integrated upgrade approach. QuikPlan is available through the ENERGY STAR Buildings Web site at www.epa.gov/appd/software.

Select A Pilot Building

The purpose of selecting a pilot building is to focus upgrade efforts on one building where you have the potential to achieve large energy and cost savings within the first two years of signing the ENERGY STAR Buildings MOU. The pilot building should be used to demonstrate an integrated whole-building upgrade. The savings from the pilot building upgrade will create your internal profit center and will demonstrate the value of energy efficiency to your organization.

In selecting the pilot building, consider such factors as the age of the building, the condition of its energy systems, the type and uses of the building, its energy intensity, and its visibility in your organization or community.

Profile Your Pilot Building Energy Use

Now that a pilot building has been identified, collect building-specific data to profile its energy use. To review the energy use, costs, and energy consumption of the building, gather all of the pilot building's energy bills for at least a two-year period, making sure to account for all sources of energy (for example, natural gas and fuel oil). Then convert the energy use listed on each bill to British thermal units (Btus) to give you a common unit of measurement. (See Figure 2 for a conversion reference sheet. If you use QuikPlan, it will do the conversions for you.)

Plot historical energy use and costs on a graph to view your energy use patterns over time. Look for trends that may indicate opportunities for upgrades. Keep in mind that energy use and energy costs vary in different areas. For example, although natural gas use

Figure 2: Energy Unit Conversion Reference Sheet

Convert energy use from different sources to British thermal units (Btus) for comparison.

Energy

- Quantity is measured in Btus.
- Energy (that is, heat) required to raise the temperature of 1 pound of water by 1 degree Fahrenheit = 1 Btu.

Electric energy

- Quantity consumed is measured in kilowatt-hours (kWhs)
- Energy provided by 1 kWh = 3,412 Btus

  $\text{kWhs consumed} \times \frac{3{,}412 \text{ Btus}}{\text{kWhs}} = \text{Btus consumed}$

Natural gas energy

- Quantity consumed is measured in hundreds of cubic feet (ccf)
- Average 100 cubic feet of natural gas = 100,000 Btus
  (Supplier must conduct a chemical analysis to determine the actual Btu content.)

  $\text{ccf consumed} \times \frac{100{,}000 \text{ Btus}}{\text{ccf}} = \text{Btus consumed}$
- Energy is measured in therms
  (Supplier must provide the conversion multiplier for the amount of therms in 1 ccf of gas.)

  $\text{ccf consumed} \times \text{multiplier (therms/ccf)} \times \frac{100{,}000 \text{ Btus}}{\text{therms}} = \text{Btus consumed}$

Fuel oil energy

- Quantity consumed is measured in gallons (gal)
- Average gallon of number 2 fuel oil = 140,000 Btus
  (Supplier must conduct a chemical analysis to determine the actual Btu content.)

  $\text{gal consumed} \times \frac{140{,}000 \text{ Btus}}{\text{gal}} = \text{Btus consumed}$

consumes the most energy, energy costs are typically highest for electricity use (see Figure 3); thus, reducing electricity consumption may provide the potential for greatest cost savings.

After compiling data on your pilot building's energy consumption, compare it with similar facilities in the same climate zone. Calculate the building's energy intensity (in kBtu/sf). Then, compare your building with other facilities in your climate zone by referring to the tables in the Appendix. Figure 4 illustrates the five climate zones in the United States; Figure 5 is a sample table for climate zone 3. If your building's energy intensity is higher than the average, you can greatly benefit from opportunities to improve energy efficiency. However, even if your building's energy intensity is at or below the average, don't neglect upgrade opportunities. If you truly optimize energy use in your building, it should operate at a level significantly below the average.

In addition to knowing what you are paying for energy, you should know how you are paying for it. A close look at the rate structure under which you are being billed may provide additional opportunities for cost savings.

Obtain a copy of the rate structure from your energy supplier. For large facilities there are typically peak demand charges, as well as charges for energy used. It is essential to recognize how these demand charges are calculated. Most utilities charge for the maximum demand in a billing month, even though it may only occur for a short time. It may be possible to move some energy-consuming activities to off-peak hours to reduce costs. In addition, if you have a billing structure that is determined by peak load, a one-time equipment malfunction that creates an unusual peak could have a significant effect on your bills. Contact your utility representative to ensure that you are on the most cost-effective rate schedule. If a situation occurs in which your peak load was artificially high because of equipment problems, contact your utility provider. Utility representatives are often willing to make billing adjustments if a customer experiences an unusual problem.

Figure 3: Energy Consumption Vs. Cost Consumption

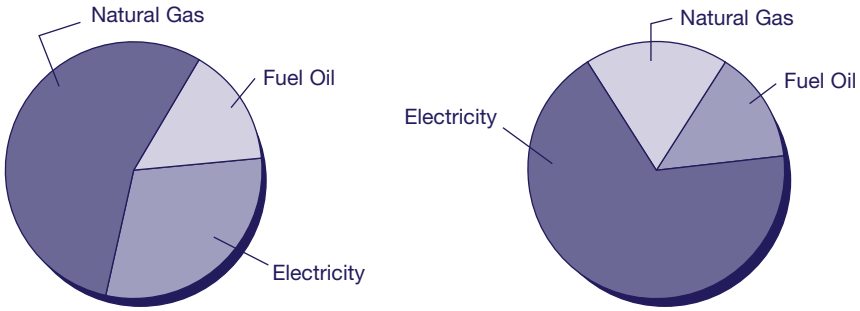
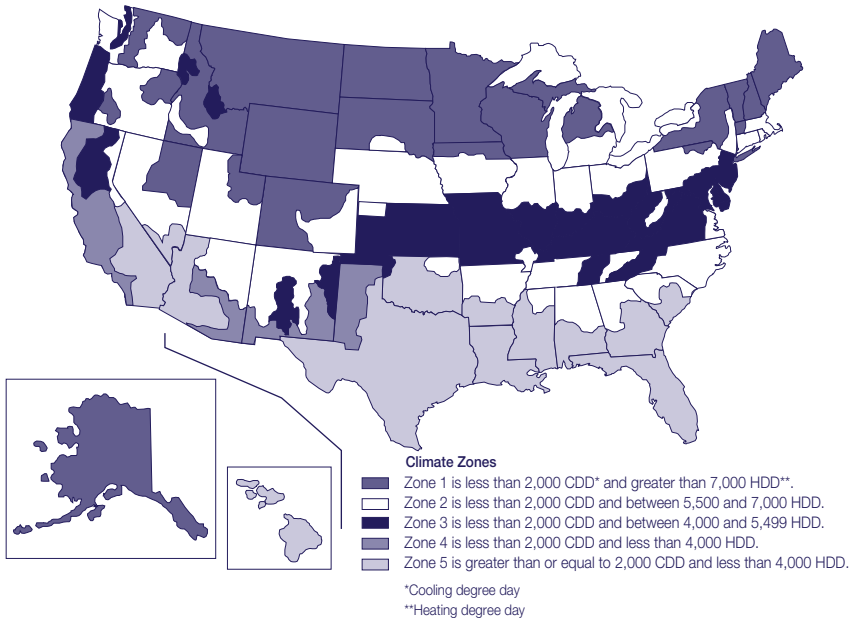


Figure 4: U.S. Climate Zones For Building Energy Consumption



Source: *Energy Information Administration/Commercial Buildings Characteristics*, 1992.

Figure 5: Average Annual Energy Use For Commercial And Industrial Buildings Located In U.S. Climate Zone 3

	Energy Intensity (kBtu/sf)			*Fuel Costs ($/sf)*		
Building Type	*Regional Average (a)*	*Your Intensity (b)*	*Your Goal (c)*	*Regional Average (d)*	*Your Costs (e)*	*Your Goal (f)*
Laboratory	306			$3.48		
Health Care (inpatient)	267			$2.68		
Food Sales	191			$3.91		
Food Service (restaurants)	160			$2.17		
Lodging (hotel, motel, dorm)	159			$1.77		
Nursing Home	155			$2.00		
Health Care (outpatient)	107			$1.79		
Public Order and Safety	99			$1.11		
Office	96			$1.52		
Warehouse (refrig.)	95			$1.61		
Mercantile/Service	74			$1.09		
Public Assembly	69			$0.99		
Education	68			$0.85		
Warehouse (nonrefrig.)	54			$0.79		
Religious Worship	26			$0.28		
Indoor Parking Garage	21			$0.38		

Data entry steps

- Column b: Calculate energy intensity using data from bills.
- Column e: Enter utility information.

Assumptions

- Based on data from U.S. DOE/EIA's 1992 *Commercial Buildings Energy Consumption Survey (CBECS).*
- Average energy intensity based on values ranging between two standard deviations above and one standard deviation below the mean value.
- Energy-intensity goal based on 35-percent energy savings.
- Costs based on $0.08/kWh for electricity and $0.60/therm for fossil fuel.

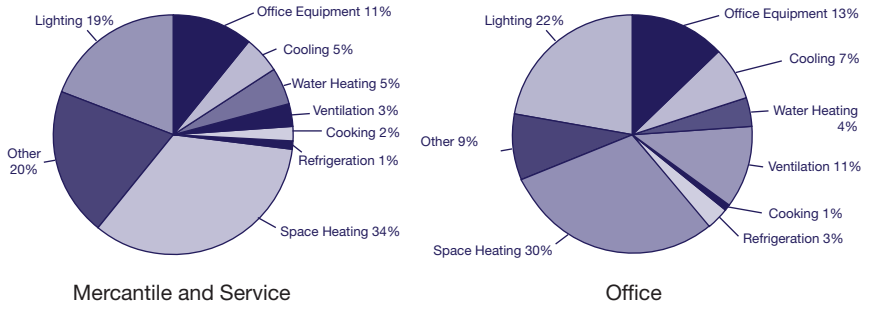
Identify Where Energy Is Used In Your Pilot Building

To identify specific upgrade opportunities, look at the way your building's energy systems consume energy (see Figure 6). Begin by locating as-built drawings and equipment manuals. As-built drawings are important because, in many cases, the equipment that is installed is different from what was shown on the design drawings. If as-built drawings are not available, you will have to walk through the building to compile data on the equipment that is in use.

Compile capacity data for all of the major equipment in the pilot building. Check equipment nameplates to see if they match the as-built drawings and the operating manuals. Having accurate equipment information, including manufacturer name, model number, size, and energy use (Btu/hr or kWh) will be helpful in further identifying profitable upgrades. For large mechanical equipment, measure the peak load and compare it with the nameplate rating to determine the percentage of the equipment's capacity that you are actually using. This can be done by installing a meter that records energy usage on an hourly basis. You may find, for example, that your fan system is much larger than necessary for the load in your building and is only operating at a fraction of its rated capacity. This information will provide you with an opportunity to "rightsize" equipment by matching the capacity of new or modified equipment more closely to the building load.

This baseline will serve as an important roadmap for your upgrades. Remember, you can't manage what you can't measure.

Figure 6: Typical Energy Consumption In Buildings



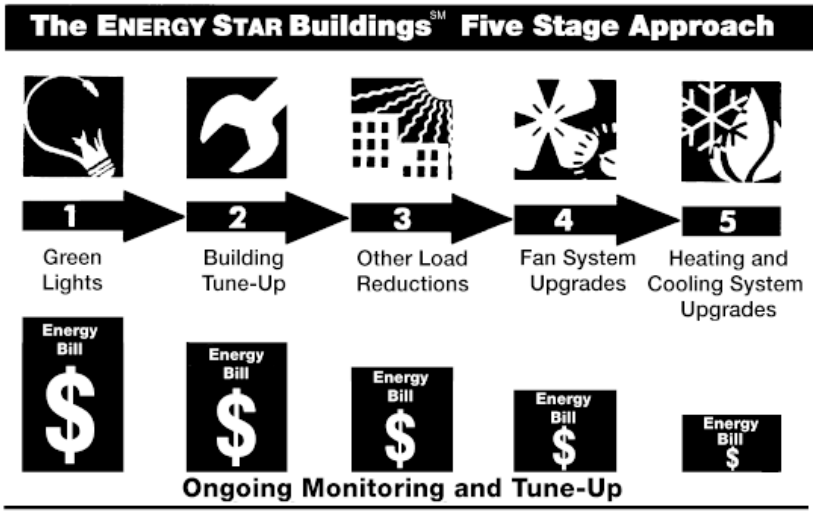
Source: DOE/EIA's 1989 and 1992 *Commercial Buildings Energy Consumption Survey*.

Forecast Savings

The ENERGY STAR Buildings Five Stage Approach for energy-efficiency upgrades (Figure 7) was developed to take advantage of interaction among a building's systems to result in average energy savings of 30 percent for the whole building. The ENERGY STAR Buildings Manual includes a complete document on each of the Five Stages:

- **Stage One—Green Lights:** Installing energy-efficient lighting systems and controls that can provide substantial energy savings at low cost.
- **Stage Two—Building Tune-Up:** Performing a comprehensive tune-up of the entire facility to get it into peak condition.
- **Stage Three—Other Load Reductions:** Finding other opportunities for increasing a building's energy efficiency, such as purchasing ENERGY STAR office equipment, installing window films, and adding insulation or a reflective coating to the roof.
- **Stage Four—Fan System Upgrades:** Rightsizing fan systems, adding variable speed drives, or converting to a variable-air-volume system, if appropriate.
- **Stage Five—Heating And Cooling System Upgrades:** Replacing chlorofluorocarbon chillers with smaller, more energy-efficient models to meet the building's reduced cooling loads and upgrading other central plant systems.

Figure 7: Five Stage Approach



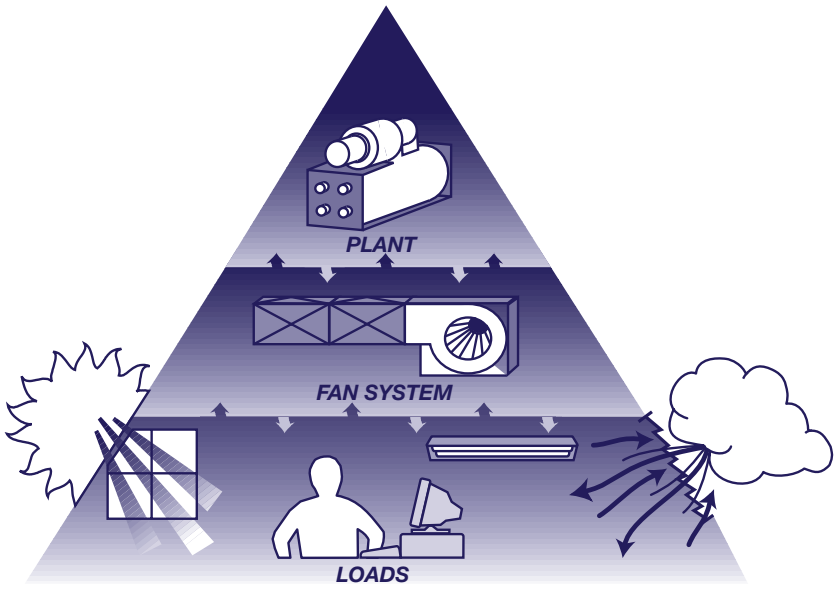
This staged approach provides a broad strategic framework for making comprehensive efficiency upgrades in a range of commercial building types.

The Five Stages are based on the physics of heat flow in buildings (Figure 8) and are designed so that heating or cooling load reductions obtained in Stages One, Two, and Three can be used to rightsize a facility's fan system and heating and cooling equipment in Stages Four and Five. Therefore, you should plan your upgrades beginning with Stage One and ending with Stage Five, although actual implementation may occur in a slightly different sequence.

To plan your whole-building upgrade, evaluate profitable upgrade opportunities in each of the Five Stages and/or ask energy consultants or ESCOs to provide an integrated upgrade approach based on the Five Stage Approach. Consider three main factors as you identify upgrade opportunities within each stage:

- **Loads**. Are the existing systems delivering the appropriate amount of light, heat, and air to meet the needs of the building's occupants? Are the systems operating at a level that is different from their designed capacity?
- **Controls**. Are the systems (especially the lighting systems) operating only when they are needed, or could savings be realized by adding timers, occupancy sensors, or modifications to an energy management system?
- **Efficiency**. Are the systems operating efficiently, or could they be improved through tune-up, repair, or replacement with more energy-efficient components?

Figure 8: Heat Flow In Buildings



Heat Flow In Buildings: Building Systems Interactions

Figure 8 shows the interaction of heating, cooling, and electrical loads with the HVAC equipment. Arrows indicate heat flow pathways. Reducing heating, cooling, and electrical loads reduces the demand on HVAC equipment, thus saving energy.

Much of the savings potential for a whole-building upgrade stems from the interactions among building systems. For example, a lighting upgrade reduces not only the direct cost of powering the lights, but also the cooling load on the central plant and on the fan systems, thereby enhancing the cost savings of those subsequent steps. You can estimate energy savings based on the cumulative effects of load reductions from Stages One through Three on rightsizing opportunities in Stages Four and Five. You can then forecast cost savings based on your estimated energy savings. Refer to Business Analysis For Energy-Efficiency Investments in this manual for guidance on evaluating the profitability of upgrades and determining the expected internal rate of return.

Incorporating the Five Stage Approach into your energy strategy should provide sufficient data to develop a proposal for a complete package of upgrades, and the business analysis will prepare you for the next step in the Action Plan: securing funding for your energy investments.

Secure Funding

Funding is often perceived as a significant barrier to implementing whole-building upgrades. However, there is generally a funding or financing option available to suit virtually any organization interested in investing in profitable upgrades. This section provides some basic guidelines that can help you secure funding for your organization. For a more detailed guide to identifying and evaluating funding options, see Financing Your Energy-Efficiency Upgrade in this manual.

Determine Your Organization's Financial Profile

To help determine appropriate funding options, develop a financial profile of your organization. The worksheet in Figure 9 provides an outline to help you collect information for the financial profile. Determine your organization's budget cycle, profit margins, energy cost percentage, cash position, debt position, and investment factors, such as average cost of capital, discount rate, internal rate of return hurdle, and simple payback threshold.

Interview Financial Personnel

Enlist the help of financial personnel to complete the financial profile. Discuss the organization's energy strategy, emphasizing its value as a low-risk investment that will improve the bottom line. After you have compiled a detailed financial profile, work with financial personnel to develop an appropriate funding approach.

Analyze All Possible Funding Approaches

Cash is the simplest funding method and may also be the cheapest; however, if cash is not readily accessible, you will need to research other financial approaches, such as loans, leases, or performance contracts. All of these options are discussed in more detail in Financing Your Energy-Efficiency Upgrade.

Analyze the feasibility of each approach based on your organization's financial profile and discussions with financial personnel. To perform a comprehensive analysis, it will be necessary to:

- Perform cash flow analyses for all your upgrade projects.
- Compare different funding approaches.
- Consult with your organization's financial managers.
- Work with your financial officer to determine the best funding approach for your organization.

Account For, Track, And Report On Savings And Cash Flows

It is important to have a method of accounting for, tracking, and reporting the savings and cash flows that result from your project, especially if entering into a performance contract (see Financing Your Energy-Efficiency Upgrade for more details). Document your progress and results so that you can inform your organization's managers and employees of actual cost and energy savings being realized. These records will also enable you to provide annual updates on your progress to EPA, which will use the data to promote energy efficiency and to recognize your organization's success.

Figure 9: Your Organization's Financial Profile

Organization Type

❑ For-profit ❑ Government/Tax exempt ❑ Not-for-profit

❑ Nonprofit ❑ Other

Organization fiscal year/budget cycle _____

Organization profit margins _____

Energy cost as a percentage of total operating cost _____

Cash position

Cash on hand ❑ High ❑ Low ❑ Need to find out

Cash flow ❑ Positive ❑ Negative ❑ Need to find out

Debt position

❑ High debt or at debt limit

❑ Can accept additional debt

❑ Need off-balance sheet approach

Investment factors

Average cost of capital _____

Discount rate _____

Internal rate of return (IRR) hurdle rate _____

Simple payback threshold _____

Use An Integrated Approach

Implement Upgrades

Before you actually begin implementation, it may be necessary to create an upgrade proposal to present to management for approval. Then, you can proceed with design and installation of the upgrades, bringing in contractors or consultants as necessary.

Develop And Present A Detailed Upgrade Proposal

At this point, you have compiled information for your upgrade project throughout the planning process; you have made an initial presentation to confirm top management commitment for ENERGY STAR Buildings; and you have kept appropriate managers informed of your progress as you developed your baseline, identified upgrade opportunities, developed a proposed upgrade package, and investigated funding options. Your final proposal should tie all of these pieces together into a comprehensive, whole-building upgrade strategy that will help you optimize energy use in your building and develop your internal profit center. The proposal will likely focus on the business rationale of energy efficiency as a low-risk investment that can provide reliable long-term returns. It should also contain estimates of your energy savings and a plan to measure your actual results.

Select Contractors For Design And Construction

After approval of the upgrade proposal, the next step is to select contractors to design and install the upgrades. Begin by preparing requests for proposals or invitations for bids that outline specifically what you want done. If in-house expertise has been used to this point, now would likely be the time to hire a project management firm or an ESCO for assistance.

Additionally, consider using ENERGY STAR Buildings Allies for your upgrade work. Allies have signed an MOU with EPA and understand the Five Stage Approach for whole-building upgrades. You can locate Allies in your area by contacting your EPA account manager or by searching the on-line *Ally Services And Products (ASAP) Directory* at www.epa.gov/asap.

The process of selecting a contractor will have to be done at least once, even if it only involves selecting a general contractor or an ESCO to be in charge of the entire project and to select the rest of the contractors for you. However, if your project will be managed in-house, you may need to select several contractors. When selecting contractors, consider their reputation, and remember that the best ones may not always submit the lowest bids. Ask them specifically about their experience with the ENERGY STAR Buildings Five Stage Approach and obtain a list of organizations with whom they have performed upgrade projects in the past. Consider contacting these organizations to learn about for their experiences with the contractor and how they responded to any problems that occurred.

Manage Installation Of Your Upgrades

The project manager must ensure that all tasks are performed according to the project plans and specifications. You may need to notify workers in your facility that construction will be occurring, temporarily relocate some employees so the construction area is more accessible to the contractors, make sure new equipment is delivered when the contractors are expecting it, and inspect installations to ensure they are performed correctly. You should also maintain and resolve punch lists of incomplete or remedial work for all contractors with whom you are working.

Monitor The Results

After the upgrades have been implemented, measure the reductions in energy consumption and energy costs that resulted from your project.

Your plan for monitoring your project's results should generally be in place before the upgrades begin. Collect and analyze the same types of information you used to develop your baseline. The more detailed your baseline, the more accurately you will be able to measure your results. For example, if you installed monitoring devices for specific energy uses, it will be possible to determine the energy savings associated with upgrades in that area. This monitoring data will form the basis for reports to your management and to EPA.

Communicate Success

Announce Your Success Within Your Organization

Now that your project is complete, you can enjoy the benefits of your upgrades. Announce your success within your organization and publicize how much money and energy are being saved, and how much pollution is being prevented due to energy-efficiency upgrades.

In the past, EPA ENERGY STAR Buildings Partners have used internal communiques, articles in internal newsletters, educational videos, and creative uses of the ENERGY STAR Buildings logo on T-shirts, hats, and mouse pads to heighten internal awareness of energy upgrades. Often, actions like these help employees to value your organization's efforts toward the environment and foster a sense of ownership in the success of the upgrade projects.

Also, this is an excellent opportunity to inform management of what the current savings are, how they compare with projected savings, and what you might be spending on energy were it not for the building upgrades.

Publicize Your Upgrades' Environmental Benefits To The Community

After announcing your success within your organization, announce your success to your community. Emphasize how much pollution has been prevented because of your building upgrades; your EPA account manager can help you determine this.

In the past, ENERGY STAR Buildings Partners have promoted their involvement with EPA through print and Internet advertising, through editorials highlighting their environmental commitment, or through creative uses of the logo on high-visibility items such as shopping bags in retail stores. In addition, you may want to take this opportunity to invite community members to tour your facilities and see first-hand the results of energy upgrades. Actions such as these improve your organization's environmental image, and your association with EPA lends third-party credibility to this image. In a time when nearly 50 percent of consumers associate themselves with environmental activism, this is an image all levels of your organization can benefit from (Roper Starch Worldwide, "1996 Green Gauge").

For more information on communicating your involvement with ENERGY STAR Buildings, both internally and externally, you can obtain the *ENERGY STAR Communications Starter Kit* from the ENERGY STAR hotline at 1-888-STAR YES.

Share Upgrade Information With EPA

Remember to share your success with EPA by keeping in touch with your account manager. Your account manager, who has been providing you with support throughout the upgrade process, can also guide you through the simple reporting process. EPA is interested in knowing what you have accomplished and can help you publicize your success.

Apply To Become ENERGY STAR Partner Of The Year

You may find that your project is unique and that you are a candidate for Partner or Ally of the Year. Have you publicized your participation in the ENERGY STAR Buildings program to your employees and to the public? Have you recruited other Partners, volunteered to speak at conferences or workshops, or hosted a workshop? If so, you could very well win an award for your efforts. Contact your account manager for information about the awards and the application process. EPA recognition of your project is a great credit to you personally and to your organization. It demonstrates a commitment to maintaining a high-quality workplace and to contributing to environmental protection.

Conclusion

Your energy strategy is the key to unlocking the hidden profits available from energy efficiency. The Action Plan you have adopted can serve as the framework for realizing energy savings, preventing pollution, and acquiring public recognition for years to come.

Having developed a successful Action Plan for implementing your energy strategy, saving money, and preventing pollution, now you can put your energy strategy into practice.

Appendix

Average Annual Energy Use For Commercial and Industrial Buildings Located In U.S. Climate Zone 1

	Energy Intensity (kBtu/sf)			*Fuel Costs ($/sf)*		
Building Type	*Regional Average* ***(a)***	*Your Intensity* ***(b)***	*Your Goal* ***(c)***	*Regional Average* ***(d)***	*Your Costs* ***(e)***	*Your Goal* ***(f)***
Laboratory	453			—		
Food Service (restaurants)	259			$3.88		
Health Care (inpatient)	236			$2.45		
Food Sales	187			$3.95		
Nursing Home	160			$1.55		
Lodging (hotel, motel, dorm)	140			$1.62		
Health Care (outpatient)	128			$1.54		
Public Order and Safety	123			$1.15		
Warehouse (refrig.)	111			$2.34		
Office	109			$1.41		
Education	94			$1.13		
Mercantile/Service	74			$0.92		
Warehouse (nonrefrig.)	69			$1.16		
Public Assembly	65			$0.73		
Indoor Parking Garage	36			$0.72		
Religious Worship	26			$0.21		

Data entry steps

- Column b: Calculate energy intensity using data from bills.
- Column e: Enter utility information.

Assumptions

- Based on data from U.S. DOE/EIA's 1992 *Commercial Buildings Energy Consumption Survey (CBECS).*
- Average energy intensity based on values ranging between two standard deviations above and one standard deviation below the mean value.
- Energy-intensity goal based on 35-percent energy savings.
- Costs based on $0.08/kWh for electricity and $0.60/therm for fossil fuel.

Average Annual Energy Use For Commercial and Industrial Buildings Located In U.S. Climate Zone 2

	Energy Intensity (kBtu/sf)			*Fuel Costs ($/sf)*		
Building Type	*Regional Average* ***(a)***	*Your Intensity* ***(b)***	*Your Goal* ***(c)***	*Regional Average* ***(d)***	*Your Costs* ***(e)***	*Your Goal* ***(f)***
Health Care (inpatient)	306			$3.18		
Food Sales	200			$3.97		
Health Care (outpatient)	196			$2.02		
Nursing Home	195			$2.12		
Food Service (restaurants)	189			$2.36		
Laboratory	159			$2.05		
Lodging (hotel, motel, dorm)	140			$1.35		
Public Order and Safety	119			$1.26		
Office	102			$1.57		
Warehouse (refrig.)	90			$1.24		
Education	90			$1.35		
Public Assembly	90			$1.10		
Mercantile/Service	69			$0.94		
Warehouse (nonrefrig.)	56			$0.59		
Indoor Parking Garage	53			$0.94		
Religious Worship	42			$0.37		

Data entry steps

- Column b: Calculate energy intensity using data from bills.
- Column e: Enter utility information.

Assumptions

- Based on data from U.S. DOE/EIA's 1992 *Commercial Buildings Energy Consumption Survey (CBECS).*
- Average energy intensity based on values ranging between two standard deviations above and one standard deviation below the mean value.
- Energy-intensity goal based on 35-percent energy savings.
- Costs based on $0.08/kWh for electricity and $0.60/therm for fossil fuel.

Average Annual Energy Use For Commercial and Industrial Buildings Located In U.S. Climate Zone 3

	Energy Intensity (kBtu/sf)			*Fuel Costs ($/sf)*		
Building Type	*Regional Average* ***(a)***	*Your Intensity* ***(b)***	*Your Goal* ***(c)***	*Regional Average* ***(d)***	*Your Costs* ***(e)***	*Your Goal* ***(f)***
Laboratory	306			$3.48		
Health Care (inpatient)	267			$2.68		
Food Sales	191			$3.91		
Food Service (restaurants)	160			$2.17		
Lodging (hotel, motel, dorm)	159			$1.77		
Nursing Home	155			$2.00		
Health Care (outpatient)	107			$1.79		
Public Order and Safety	99			$1.11		
Office	96			$1.52		
Warehouse (refrig.)	95			$1.61		
Mercantile/Service	74			$1.09		
Public Assembly	69			$0.99		
Education	68			$0.85		
Warehouse (nonrefrig.)	54			$0.79		
Religious Worship	26			$0.28		
Indoor Parking Garage	21			$0.38		

Data entry steps

- Column b: Calculate energy intensity using data from bills.
- Column e: Enter utility information.

Assumptions

- Based on data from U.S. DOE/EIA's 1992 *Commercial Buildings Energy Consumption Survey (CBECS).*
- Average energy intensity based on values ranging between two standard deviations above and one standard deviation below the mean value.
- Energy-intensity goal based on 35-percent energy savings.
- Costs based on $0.08/kWh for electricity and $0.60/therm for fossil fuel.

Average Annual Energy Use For Commercial and Industrial Buildings Located In U.S. Climate Zone 4

	Energy Intensity (kBtu/sf)			*Fuel Costs ($/sf)*		
Building Type	*Regional Average* ***(a)***	*Your Intensity* ***(b)***	*Your Goal* ***(c)***	*Regional Average* ***(d)***	*Your Costs* ***(e)***	*Your Goal* ***(f)***
Food Service (restaurants)	299			$3.96		
Health Care (inpatient)	235			$3.23		
Laboratory	199			$2.57		
Food Sales	187			$3.55		
Nursing Home	132			$1.44		
Lodging (hotel, motel, dorm)	130			$1.03		
Public Order and Safety	110			$1.49		
Mercantile/Service	93			$1.38		
Warehouse (refrig.)	92			$2.05		
Office	88			$1.67		
Health Care (outpatient)	84			$1.13		
Public Assembly	78			$1.35		
Education	70			$1.03		
Warehouse (nonrefrig.)	32			$0.53		
Indoor Parking Garage	23			$0.48		
Religious Worship	22			$0.30		

Data entry steps

- Column b: Calculate energy intensity using data from bills.
- Column e: Enter utility information.

Assumptions

- Based on data from U.S. DOE/EIA's 1992 *Commercial Buildings Energy Consumption Survey (CBECS).*
- Average energy intensity based on values ranging between two standard deviations above and one standard deviation below the mean value.
- Energy-intensity goal based on 35-percent energy savings.
- Costs based on $0.08/kWh for electricity and $0.60/therm for fossil fuel.

Average Annual Energy Use For Commercial and Industrial Buildings Located In U.S. Climate Zone 5

	Energy Intensity (kBtu/sf)			Fuel Costs ($/sf)		
Building Type	*Regional Average (a)*	*Your Intensity (b)*	*Your Goal (c)*	*Regional Average (d)*	*Your Costs (e)*	*Your Goal (f)*
Health Care (inpatient)	236			$3.15		
Lodging (hotel, motel, dorm)	197			$3.16		
Food Service (restaurants)	187			$3.25		
Food Sales	137			$2.96		
Laboratory	133			$2.60		
Office	122			$1.74		
Nursing Home	116			$1.84		
Public Order and Safety	101			$1.40		
Health Care (outpatient)	91			$1.72		
Education	54			$0.81		
Public Assembly	50			$1.01		
Mercantile/Service	49			$0.90		
Warehouse (nonrefrig.)	31			$0.51		
Warehouse (refrig.)	28			$0.64		
Religious Worship	25			$0.40		
Indoor Parking Garage	22			$0.50		

Data entry steps

- Column b: Calculate energy intensity using data from bills.
- Column e: Enter utility information.

Assumptions

- Based on data from U.S. DOE/EIA's 1992 *Commercial Buildings Energy Consumption Survey (CBECS).*
- Average energy intensity based on values ranging between two standard deviations above and one standard deviation below the mean value.
- Energy-intensity goal based on 35-percent energy savings.
- Costs based on $0.08/kWh for electricity and $0.60/therm for fossil fuel.

To learn about EPA's ENERGY STAR Buildings Partnership,

visit our Web site at
http://www.epa.gov/buildings.

To request a catalog of available materials or for more information, call the ENERGY STAR hotline at 1-888-STAR YES.